

MEASUREMENTS OF SHOCK EFFECTS RECORDED BY ITOKAWA SAMPLES.

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Introduction: We requested and have been approved for 5 Hayabusa samples in order definitively establish the degree of shock experienced by the regolith of asteroid Itokawa, and to devise a bridge between shock determinations by standard light optical petrography, crystal structures as determined by synchrotron X-ray diffraction (SXRD), and degree of crystallinity as determined by electron back-scattered diffraction (EBSD) [1,2]. As of the writing of this abstract we are awaiting the approved samples. We propose measurements of astromaterial crystal structures and regolith processes. The proposed research work will improve our understanding of how small, primitive solar system bodies formed and evolved, and improve understanding of the processes that determine the history and future of habitability of environments on other solar system bodies. The results of the proposed research will directly enrich the ongoing asteroid and comet exploration missions by NASA, JAXA and ESA, and broaden our understanding of the origin and evolution of small bodies in the early solar system, and elucidate the nature of asteroid and comet regolith.

References: [1] Zolensky et al. (2012) *Lunar and Planetary Science*, XLIII, #1477, Lunar Planet. Inst., Houston (CD-ROM); [2] Zolensky et al. (2014) *Hayabusa 2014: 2nd Symposium of Solar System Materials. Abstracts*.